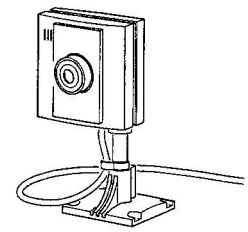
CCD B/M Observation Camera

X9-B/W (Eco)

VCM8935T/00T
VC89355T
VC89755T
98CM355R

Service
Service
Service



NORTH-AMERICAN MODELS:
Service Manual: 8053

Service Manual

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Contents

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1. Introduction

X9-B/W (Eco) is a new family of CCD Black & White Observation Cameras.
This family covers following type of cameras:

VCM8935/00T	4 mm F1.2 integrated lens
VC89355T	4 mm F1.2 integrated lens
VC89755T	4 mm CS-lens
98MC355R	4 mm F1.2 integrated lens

This range of camera packs is the fully backwards compatible successor of the X1- B/W (VCM81..) range of camera packs.

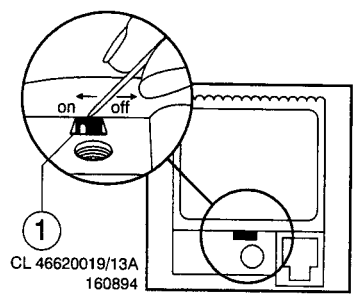
2. Technical Data

Power supply voltage	9.6 to 27V DC , as supplied by observation system monitor or the system junction box, connected with max. 200 m. recommended cable.
Power consumption	50 mA at 24V DC
Power source	Any DC voltage generator (including observation system monitor), feeding through the signal coax cable. The DC voltage plus ripple must remain within the limits of 9.6 - 27V DC at the camera entrance.
System cable	4-wire twisted pair of telephone cable (25 m included in the carton).
Video output	2-wire interface via system cable.
Sound output	2-wire interface via system cable. TV system dependent.
Microphone	Built in, electret (can be switched-off on the camera).
Synchronization	None
Pick up element	1/3" Solid state CCD EIA : LZ2336 PAL : LZ2346
Picture elements	362(H) x 492(V) for EIA 362(H) x 582(V) for PAL
Gamma	fixed 0.45
Gain control	Automatic -6 to 18 dB.
Sensor illumination range:	
. for integrated lens:	2.5 lux (50 IRE) to 30000 Lux F2.0, 3200K, lens transmission 80%, scene reflection 75%
. for CS mount lens:	1 lux (50 IRE) to 11000 lux F1.2, 3200K, lens transmission 80%, scene reflection 75%

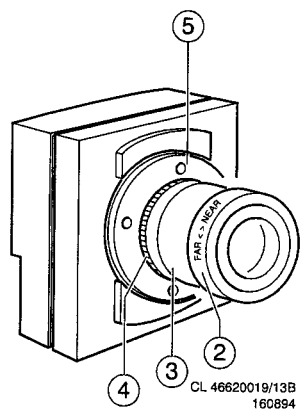
2. Technical Data

Lens	**Integrated Lens**	**CS-mount**
Mounting	fixed mount	CS standard
Image format	1/3"	1/3"
Focal length	3.8 mm	4 or 8 mm
Angles of view	64.4 deg. horizontal 49.6 deg. vertical	61 or .. deg. horizontal 48 or .. deg. horizontal
Relative aperture	F2.0	F1.2
Focus	fixed, 1m - infinity	adjustable
Dimensions (HxWxD)	70 * 70 * 54	70 * 70 * 79 (with lens)
Weight	130 g.	205 g. (with lens)
Ambient temperature		
Operating	-20° to +55° Centigrade.	
Storage	-25° to +70° Centigrade.	
Ambient humidity		
Operating	20 to 90 % RH	
Storage	up to 99 % RH	
Service policy	First line service: Board swapping using simple diagnoses, see chapter 9 for the details. Second line service: Central repair at factory, see chapter 7 for the details.	

3. Control Functions

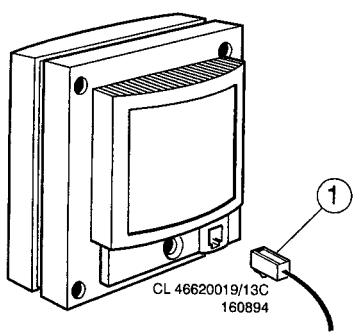


1. Sound on/off switch

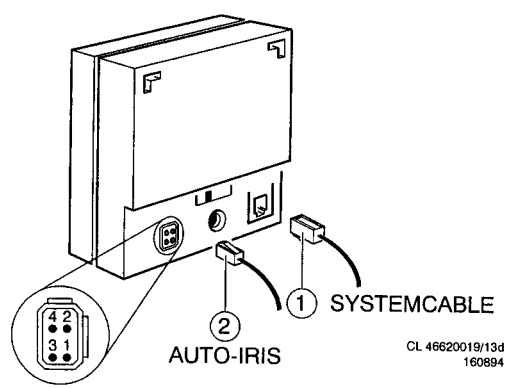


2. Focus ring
3. Objective
4. CS-casing
5. Blocking ring

4. Connections



1. System cable



1. System cable
2. Diaphragm cable

5. Warning and Notes

WARNINGS

1. NEVER measure directly at the output of the CCD image sensor.
   It will destroy the sensor immediately.

2. Safety regulations require that the unit should be returned in its original conditions and that components identical to the original components are used. The safety components are indicated by the symbol ⚠.

3. All ICs and many other semi-conductors are sensitive to electrostatic discharges (ESD) .
   Careless handling during repair can drastically shorten the life. Make sure that during repair you are connected by a pulse band with resistance to the same potential as the earth of the unit.
   Keep components and tools also at this same potential.

4. When making settings, use plastic rather than metal tools. This will prevent any short-circuit and the danger of a circuit becomes unstable.

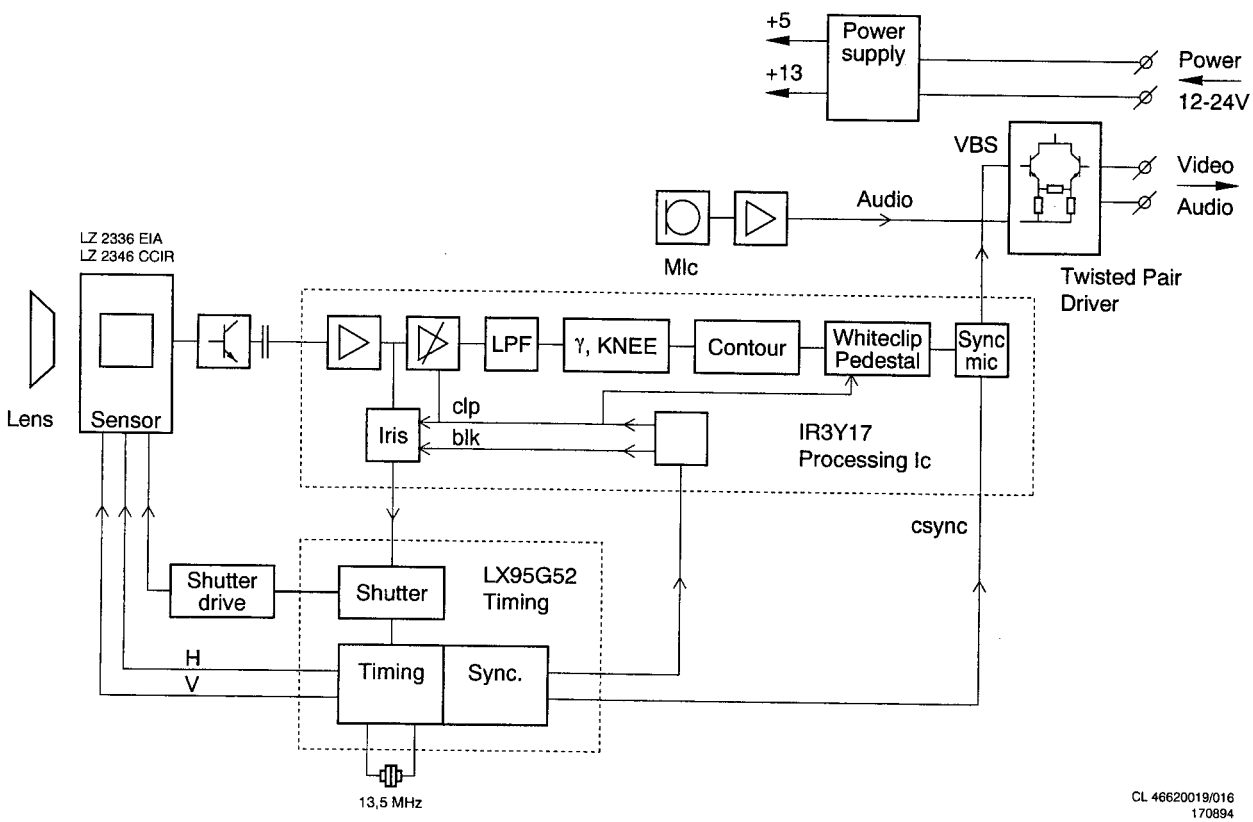
5. Always switch off the set before replacing any of the components or separating the PW boards.

6. Never aim the camera at the sun or other extremely bright light sources.

NOTES:

1. This manual is prepared for all types of cameras (known at this moment) within X9- B/W (Eco) family range.
   The types are mentioned on the front page as well as in the Introduction chapter.
   This manual support the board swapping repairs.

6. Block Diagram



7. Service policy

The Service policy for this product is : board swapping as first line service. It means only replacement of the defective board. In case of necessary repairs, the defective "repairable" boards must be returned to Philips Consumer Service according the central repair procedure.

This camera type contains one assembly, which can be repaired centrally via the so called "central repair procedure".
The relevant panels are mentioned under the heading "Repairables" in chapter 10 (spare parts list).
The central repair procedure has been introduced to guarantee a fast, efficient and correct repair of panels or assemblies with complex circuitries or new technologies.

Central Repair Procedure:

Contact your local service organisation to obtain a repairable board. After confirmation a replacement panel or assembly will be sent to you. Send the defective panel or assembly inclusive a "(standard) repair form" to your local service organisation.
The defective panel should be correctly packed inclusive ESD protecting material. The original packing of the returned/replacement panel can be used for this purpose.
The accompanying "repair form" of chapter 11 should contain all basic information such as:

- full model number of the set
- date of failure
- reporting country
- serial number/production code of the set
- description of the failure including timing indication (immediate, after ... minutes warming up, sometimes)

8. Alignment Instructions

Aligned boards will be offered as spare parts.

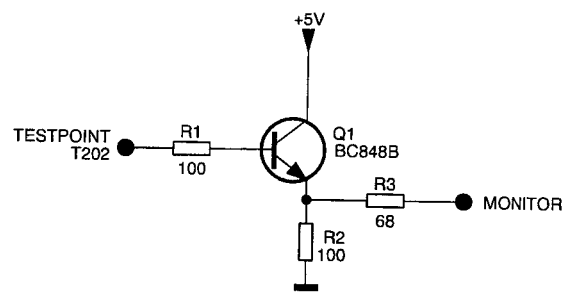
You, therefore, do not need any such alignments. However, as a precaution we are also including these alignment instruction as follows:

Used measurement equipment:

- dual trace oscilloscope (30MHz) PM3262
- triple power supply PE1542
- automatic multimeter PM2519
- frequency counter PM6673
- monitor for CCIR/EIA
- Test Box:
  Dai Nippon light box (4x FL-10W)
  Luminance 850 NT +/- 50 NT
- DNP EIAJ test chart-A (resolution chart)
- DNP EIAJ test chart-J (V/10 chart)
- DNP EIAJ test chart-II (11 steps Y= 0.45, grey scale)
- N.D. filter 2.0 and 3.0

Connection sensor panel:

Connect the voltages (+13.2V, +5V) to the sensor panel. Connect a 75Ω video buffer to the video-output of processing IC 7180 (T202) acc. to figure 1.



Terminate the videosignal at the monitor with 75Ω.
Connect the videosignal also to the oscilloscope and trigger on it. Settings oscilloscope 200mV/div and 20µs/div.
Keep this signal during adjusting connected to the oscilloscope and connect the probe for measurements to the other channel.
Switch on the power-supply and measure the current:

pin 4 connector 1900 13.2V	: 8 mA
pin 8 connector 1900 5V	: 75 mA
Measure the oscillator freq. on T175	: 6.75 Mhz ± 27 kHz.
Measure the Max.gain on T231	: ≤ 2.35V
Measure the Gamma on T251	: 1.4 ± 0.15 V.
Measure the Knee on T253	: 3.4 ± 0.15 V.
Measure the Apa-ctrl T223	: 2.4 ± 0.15 V.
Measure the Bclip on T220	: 1.5 ± 0.15 V.
Measure the Gain-ctrl on T216	: 3.4 ± 0.10 V.
Measure the Wclip on T209	: 2.8 ± 0.10 V.
Measure the Pedestal on T205	: 2.7 ± 0.15 V.
Measure the Setnr on T184	: 2.6 ± 0.10 V.
Measure the Setnr on T185	: 2.4 ± 0.10 V.

Adjustment of the back focus:

Aim the camera (sensor panel) to a resolution testchart approximately 2.5 meters in front of the lens.
Adjust the back focus of the lens, so that the visible moire in the video image has reached its maximum intensity.

Adjustment anti-blooming (ofd):

Aim the camera to a V/10 chart. The square should be in the middle of the image.
Adjust 3142 (OFG) so that no blooming occurs.

Check shutterspeed:

Point camera to the Dai Nippon lightbox. Place a grey scale chart in the light box. Connect an oscilloscope to T230, pin 43 of IC 7180. Settings oscilloscope: 100mV/div and 20µs/div. Hold your hand before the camera lens for a moment so you can determine the black level of CDS output signal. Check the amplitude of video signal; the level is 200mVpp. Change scene illumination from low light to high light and see whether the monitor video signal level on oscilloscope doesn't change in amplitude.

Adjustment agc:

Point camera to a grey scale chart. Connect oscilloscope to video output.
Settings oscilloscope 200mV/div and 20µs/div. Adjust 3249 (AGC) so that output level is 1Vpp. Place ND filter 3.0 in front of the lens and see whether AGC is working.

Check anti-blooming level:

Point camera to a V/10 chart. The square should be on top of image. Place a ND-filter in front of the lens with value of 2.0.
Connect an oscilloscope to testpoint T230. Settings: 50mV/div and 20µs/div.
Adjust the light intensity so that the CCD sensor signal level is 200mV at the square.
Remove the ND-filter and check for Anti-blooming (this effect is best seen in differences in smearing). If necessary then re-adjust 3142 (OFG). Then point camera to an equally white scene and check on monitor whether Light Fixed Pattern Noise is visible, if so then re-adjust 3142 (OFG) lower.

9. Fault Diagnosis on Board level

Before starting with the diagnosis, connect the "defective" camera according Fig. 9.1 to a test monitor.

Note: This circuit is advised for checkin purpose. The pin numbers (2 to 5) of the camera cable are the same as pin numbers of the connector 1902 on the power board of the camera.

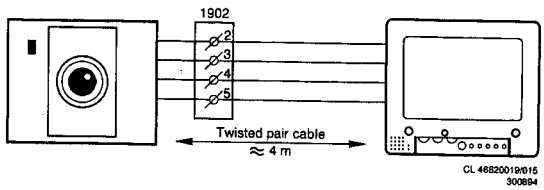
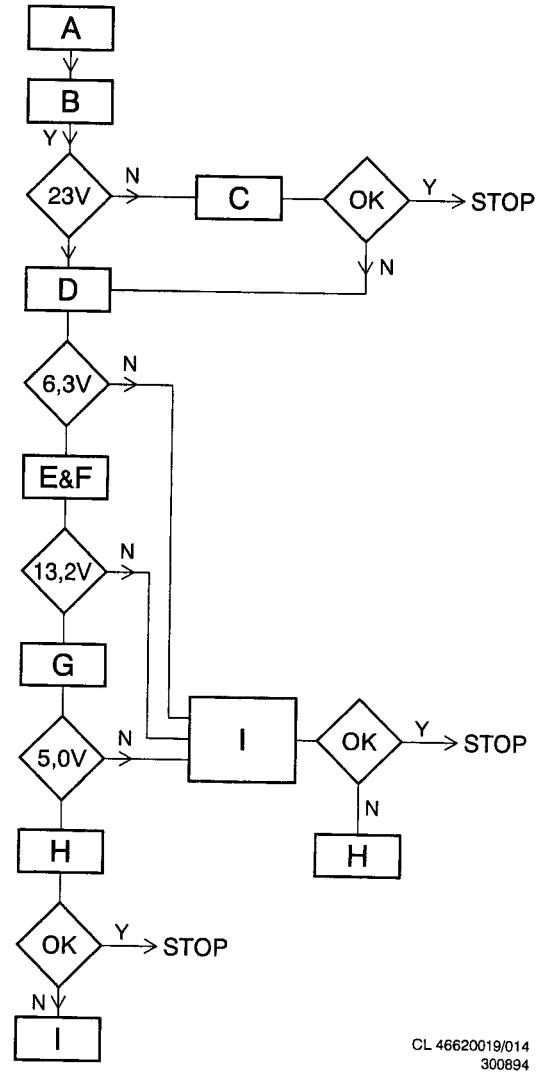


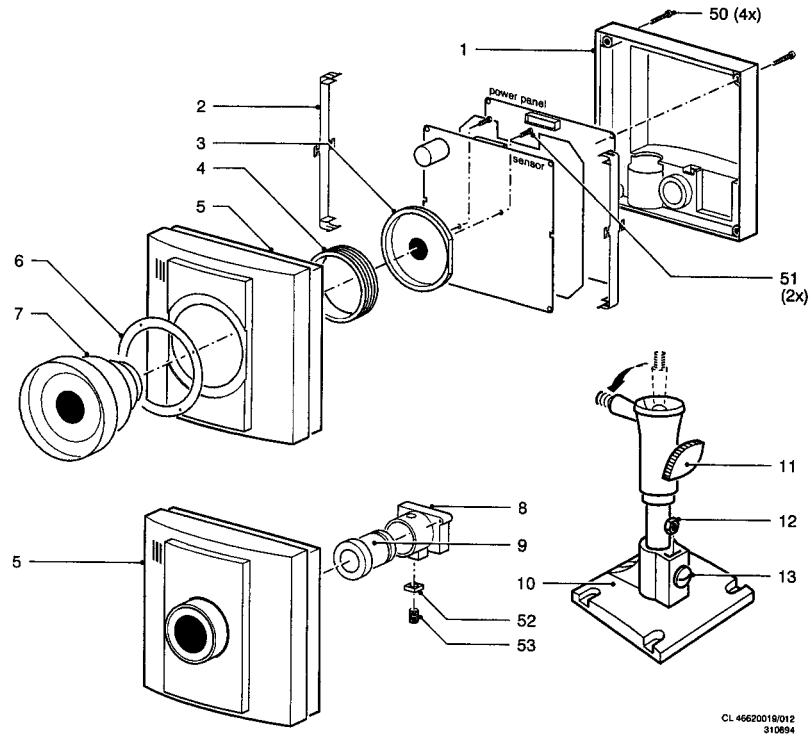
Fig. 9.1

A- Check if the audio switch of the camera is in the position "ON"
B- Measure the voltage between pins 4 and 5 of the cable. It should be 23 Volt ± 2 V.
C- Replace the test monitor by another one.
D- Measure the voltages between pins 2 and 5 and between pins 3 and 5 of the cable. They should be 6,3 Volt ± 0,5 V
E- Open the camera housing.
F- Measure the voltages on pin 4 and 5 of the AMP connector 1900 on Power board. It should be 13,2 Volt ± 0,3 V.
G- Measure the voltages on pin 8 of the AMP connector 1900 on Power board. It should be 5 Volt ± 0,1 V.
H- Replace Sensor Board
I- Replace Power Supply Board

Symptom: No Picture or Poor Picture
No audio or poor audio



10. Spare Parts Lists



POSITION NUMBER	SERVICE CODE	DESCRIPTION
1	4822 432 60924	Rear cabinet- grey
1	4822 432 60928	Rear cabinet- black
2	4822 466 93052	Spacer (2*)
3	4822 532 61221	Sensor interface
4	4822 532 12133	CS-mount ring
5	4822 432 60925	Front cabinet- grey
5	4822 432 60926	Front cabinet for CS-mount
5	4822 432 60927	Front cabinet- black
6	4822 532 12134	Retaining ring
7	4822 381 11473	CS-lens 4 mm F1.2
8	4822 256 80074	Lens holder
9	4822 381 11472	Lens 3.8 mm F2.0
10	4822 462 10507	Tripod assy- grey
10	4822 462 10516	Tripod assy- black
11	4822 413 41884	Knob for tripod- grey
11	4822 413 41885	Knob for tripod- black
12	4822 505 10665	Lock nut M5 for tripod
13	4822 502 21582	Screw M5*8 for tripod
50	4822 502 13887	Torx screw 2*20 (4*)
51	4822 502 13886	Torx screw 2*5 (2*)
52	4822 505 10635	Lock nut M3
53	4822 502 10176	Screw M3x5
	Various:	
	4822 321 62696	Camera cable 15 meter
	Electrical:	
1021	4822 212 31668	power supply pwb assy
1100	5322 265 40903	10 pins female connector on sensor board
1265	4822 242 30176	Microphone
1870	4822 277 21765	Switch (AUDIO OFF/ON)
1900	4822 265 41281	10 pins female connector on power board
1902	4822 267 41183	4 pins (telephone) connector on power board
	REPAIRABLES:	These unit can be returned to PCS for repairing at factory, see chapter 7.
1020	4822 212 31674	Sensor pwb assy (VCM8935/..T)
1020	4822 212 31307	Sensor pwb assy (VC89355T, 98MC355R)
1020	4822 212 31673	Sensor pwb assy (VC89755T)

11. Complaint description form(s)

FAULT DESCRIPTION FORM

Model number of the defective product :

Date of failure: .. - .. - 19..

Serial number of the defective product : **OP**.... 9...... ....

Country : ....

Fault description :

Please add this description form in the box with the defective panel !!

FAULT DESCRIPTION FORM

Model number of the defective product :

Date of failure: .. - .. - 19..

Serial number of the defective product : **OP**.... 9...... ....

Country : ....

Fault description :

Please add this description form in the box with the defective panel !!

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FAULT DESCRIPTION FORM

Model number of the defective product :

Date of failure: .. - .. - 19..

Serial number of the defective product : **OP**.... 9...... ....

Country : ....

Fault description :

Please add this description form in the box with the defective panel !!